IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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		§	Examiner:	Mardochee Chery
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For:	System and Method for Creating Ordering Points	§	Docket:	200313614-1 (HPC.1047US)
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APPEAL BRIEF

Date of Deposit: August 23, 2010

I hereby certify that this correspondence is being transmitted electronically to the U.S. Patent Office on the date indicated above.

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REAL PARTY IN INTEREST

The Hewlett-Packard Development Company, LP, a limited partnership established under the laws of the State of Texas and having a principal place of business at 20555 S.H. 249 Houston, TX 77070, U.S.A. (hereinafter "HPDC"). HPDC is a Texas limited partnership and is a wholly-owned affiliate of Hewlett-Packard Company, a Delaware Corporation, headquartered in Palo Alto, CA. The general or managing partner of HPDC is HPQ Holdings, LLC.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

STATUS OF CLAIMS

The application was originally filed with claims 1-35. During prosecution, claims 34 and 35 were amended. Claim 35 has been indicated as allowable if rewritten in independent form to including all of the limitations of the base claim and any intervening claims. Claims 1-34 are the subject of this Appeal.

STATUS OF AMENDMENTS

No Reply was submitted to the Final Office Action mailed on March 22, 2010. All amendments have therefore been entered.

SUMMARY OF CLAIMED SUBJECT MATTER

At this point, no issue has been raised that would suggest that the words in the claims have any meaning other than their ordinary meanings. Nothing in this section should be taken as an indication that any claim term has a meaning other than its ordinary meaning.

Independent claim 1 is directed to a system (*e.g.*, 10 of Fig. 1) comprising a first node (*e.g.*, 12 of Fig. 1) operative to provide a source broadcast requesting data (*e.g.*, para. [0031], page 7, lines 10-16), the first node (*e.g.*, 12 of Fig. 1) associating an F-state with a copy of the data in response to receiving the copy of the data from memory (*e.g.*, 16 of Fig. 1) and receiving non-data responses from other nodes (*e.g.*, 14 and 20 of Fig. 1) in the system (*e.g.*, 10 of Fig. 1; para. [0032], page 7, line 17 to page 8, line 2). The non-data responses include an indication that at least a second node (*e.g.*, 14 of Fig. 1) includes a shared copy of the data (*e.g.*, para. [0032], page 7, line 17 to page 8, line 2). The F-state enables the first node (*e.g.*, 12 of Fig. 1) to serve as an ordering point in the system (*e.g.*, 10 of Fig. 1) capable of responding to requests from the other nodes (*e.g.*, 14 and 20 of Fig. 1) in the system (*e.g.*, 10 of Fig. 1) with a shared copy of the data (*e.g.*, para. [0033], page 8, lines 3-14).

Independent claim 14 is directed to multiprocessor network (*e.g.*, 100 of Fig. 3) comprising a plurality of processor nodes (*e.g.*, 102, 104 and 106 of Fig. 3) in communication with each other (*e.g.*, para. [0050], page 13, lines 1-8). At least a first node (*e.g.*, 102 of Fig. 3) of the plurality of processor nodes (*e.g.*, 102, 104, 106 of Fig. 3) includes a copy of data associated with a given address that is also shared with memory (*e.g.*, 110 of Fig. 3; para. [0050], page 13, lines 1-8). The first node (*e.g.*, 102 of Fig. 3) operates in a first state that causes the first node (*e.g.*, 102 of Fig. 3) to respond to a non-ownership request from a second node of the plurality of processor nodes (*e.g.*, 102, 104, 106 of Fig. 3) for the data by (i) sending a response to the second node (*e.g.*, 104, 106 of Fig. 3) that includes a shared copy of the data, and (ii) transitioning from the first state to a second state indicating that the data is shared (*e.g.*, para. [0060], page 17, lines 15-27). The second node (*e.g.*, 104, 106 of Fig. 3) transitions to a third state in response to receiving the shared copy of the data from the first node (*e.g.*, 102 of Fig. 3), such that the second node (*e.g.*, 104, 106 of Fig. 3) becomes an ordering point in the network for providing a shared copy of the data (*e.g.*, para. [0060], page 17, lines 15-27).

Independent claim 20 is directed to a computer system (*e.g.*, 50 of Fig. 2), comprising a plurality of processors (*e.g.*, 54, 56, 58, 60 of Fig. 2; para. [0045], page 11, lines 26-31). The

plurality of processors includes a source processor (*e.g.*, 56 of Fig. 2) that issues a broadcast request for desired data while in a first state (*e.g.*, para. [0046], page 11, line 32 to page 12, line 3). The plurality of processors also includes at least one target processor (*e.g.*, 54, 58, 60 of Fig. 2) having an associated cache (*e.g.*, 64, 68, 70 of Fig. 2) that includes a shared copy of the desired data (*e.g.*, para. [0047], page 12, lines 4-15). The at least one target processor (*e.g.*, 54, 58, 60 of Fig. 2) responds to the broadcast request with a response indicating that the at least one target processor (*e.g.*, 54, 58, 60 of Fig. 2) includes the shared copy of the desired data (*e.g.*, para. [0047], page 12, lines 4-15). Memory (*e.g.*, 72 of Fig. 2) stores the desired data and responds to the broadcast request with a response that includes a copy of the desired data (*e.g.*, para. [0047], page 12, lines 4-15). The source processor (*e.g.*, 56 of Fig. 2) transitions from the first state to a second state in response to receiving the responses from the memory (*e.g.*, 72 of Fig. 2) and the at least one target processor (*e.g.*, 54, 58, 60 of Fig. 2); para. [0047, page 12, lines 4-15). The second state enables the first processor (*e.g.*, 56 of Fig. 2) to respond to requests from other of the plurality of processors (*e.g.*, 54, 58, 60 of Fig. 2) with a copy of the desired data (*e.g.*, para. [0047], page 12, lines 4-15).

Independent claim 26 is directed to a system (*e.g.*, 10 of Fig. 1, 50 of Fig. 2, 100 of Fig. 3) comprising means for broadcasting from a first node (*e.g.*, 12 of Fig. 1, 56 of Fig. 2, 100 of Fig. 3, 150 of Fig. 4, 160 of Fig. 5, 170 of Fig. 6, 190 of Fig. 7, 200 of Fig. 8) a non-ownership request for data (*e.g.*, paras. [0032], [0046], [0060]). The system also comprises means for indicating (*e.g.*, 14 and 20 of Fig. 1; 54, 58 and 60 of Fig. 2; 104 and 106 of Fig. 3; 154 of Fig. 4, 164 of Fig. 5; 176 of Fig. 6; 194 of Fig. 7; 204 of Fig. 8) that at least one other node in the system has a shared copy of the requested data (*e.g.*, paras. [0032], [0047], [0059], [0063], [0064], [0065], [0067], [0068], [0069]). The system further comprises means for providing from memory (*e.g.*, 16 of Fig. 1; 72 of Fig. 2; 110 of Fig. 3, 156 of Fig.4; 168 of Fig. 5; 176 of Fig. 6) a copy of the requested data to the means for broadcasting (*e.g.*, paras. [0063]-[0065]). The system further comprises means for enabling the first node (*e.g.*, 12 of Fig. 1; 56 of Fig. 2, 100 of Fig. 3; 150 of Fig. 4, 160 of Fig. 5, 170 of Fig. 6, 190 of Fig. 7; 200 of Fig. 8) to respond to subsequent non-ownership requests for the data from other nodes in the system by providing a shared copy of the data received from memory (*e.g.*, paras. [0033], [0049], [0060], [0063], [0064], [0066], [0069]).

Independent claim 30 is directed to a method comprising broadcasting (*e.g.*, 300 of Fig. 9) a read request for data from a source node to other nodes of an associated system (*e.g.*, para. [0071]). The method further comprises transitioning (*e.g.*, 310 of Fig. 9) the source node into an F-state in response to receiving the data from memory and receiving non-data responses from other target nodes in the system indicating that the data is shared with at least one of the other target nodes (*e.g.*, para. [0071]). The method further comprises enabling (*e.g.*, 320 of Fig. 9) the source node, while in the F-state, to serve as an ordering point that is capable of responding to non-ownership requests for the data by providing a shared copy of the data (*e.g.*, para. [0071]).

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. **Whether Claims 1-6, 8, 9, and 13 are unpatentable under 35 U.S.C. § 103(a) over Cypher (U.S. Patent Publication No. 2004/0002992) in view of Hum (U.S. Patent No. 6,922,756).**

B. **Whether Claims 7 and 10 are unpatentable under 35 U.S.C. § 103(a) over Cypher in view of Hum (U.S. Patent No. 6,922,756) and further in view of Hum (U.S. Patent Publication No. 2004/0123047).**

C. **Whether Claims 11, 12, 14, 15, and 17-34 are unpatentable under 35 U.S.C. § 103(a) over Cypher in view of Hum (U.S. Patent No. 6,922,756) and further in view of Arimilli (U.S. Patent No. 6,138,218).**

D. **Whether Claims 16 and 22 are unpatentable under 35 U.S.C. § 103(a) over Cypher in view of Hum (U.S. Patent No. 6,922,756), Arimilli, and further in view of Hum (U.S. Patent Publication No. 2004/0123047).**

ARGUMENT

A. Whether Claims 1-6, 8, 9, and 13 are unpatentable under 35 U.S.C. § 103(a) over Cypher (U.S. Patent Publication No. 2004/0002992) in view of Hum (U.S. Patent No. 6,922,756).

1. Independent Claim 1 and Dependent Claims 5-6 and 8-9

The proposed combination of Cypher and Hum does not render claim 1 obvious. Claim 1 requires a first node that provides a source broadcast requesting data. In response to receiving a copy of the data from memory and receiving non-data responses from other nodes in the system, the first node associates an F-state with the received copy of the data. Claim 1 further requires that the non-data responses include an indication that at least a second node includes a shared copy of the data. Yet further, claim 1 requires that the F-state enables the first node to serve as an ordering point in the system capable of responding to requests from the other nodes with a shared copy of the data.

In formulating the obviousness rejection of claim 1, the Final Office Action has relied on paragraphs [0007], [0008], [0068], [0075] and [0076] of Cypher as allegedly teaching all of the limitations recited in claim 1 except for an F-state. *See* Final Office Action, at p. 4. While Appellant agrees that Cypher does not teach an F-state, Appellant respectfully disagrees with the Final Office Action's remaining characterizations of Cypher. More particularly, paragraphs [0007] and [0008], which are in the background section of Cypher, simply acknowledge that shared memory multiprocessing systems generally employ either a broadcast snooping cache coherency protocol or a directory based cache coherency protocol. According to paragraph [0008] of Cypher, a directory-based protocol involves point-to-point messaging rather than unconditional broadcasts.

The Final Office Action attempts to combine Cypher's background statements about coherency protocols (including a broadcast protocol) in general with a paragraph [0068] of Cypher, which is specifically directed toward the particular protocol implemented in Cypher. This attempt amounts to nothing more than selectively combining unrelated teachings in an improper manner. More particularly, regardless of the fact that Cypher acknowledges the existence of broadcast protocols, Cypher's paragraph [0068] does not disclose a situation in which a broadcast protocol is used to request data, but instead is directed toward a directory-

based protocol (i.e., point-to-point protocol) scenario. In Cypher's implementation, and as described in paragraph [0068] a point-to-point request for data is made---i.e., the requestor transmits the request to the home memory subsystem. This point-to-point request is not a source broadcast for data, as required in claim 1, because it is sent only to the home agent. Moreover, while Cypher does disclose that the requestor receives the requested data from the home agent (or from an owning agent in response to a demand from the home agent), Cypher does not disclose that the requestor also receives non-data responses from other nodes in the system indicating that at least a second node includes a shared copy of the data, as required by claim 1. In fact, Cypher does not disclose that any requestor receives both the copy of the data from memory ***and*** non-data responses from other nodes. Accordingly, Cypher does not in any way disclose---or even contemplate---a first node that provides a source broadcast for data and then associates an F-state (or any other state) with a copy of the data ***in response to*** receiving the copy from memory ***and*** receiving non-data responses from other nodes, as required by claim 1.

Hum does not compensate for the deficiencies of Cypher in this regard. In contrast to the contentions made in the Final Office Action, the F-state taught in Hum does not correspond to the F-state recited in claim 1. That is, in contrast to the F-state recited in claim 1, Hum does not disclose that its F-state is associated with a copy of the data ***in response to*** receiving the copy of the data from memory ***and*** receiving non-data responses from other nodes in the system.

Accordingly, even if the teachings of Cypher could be modified with the teachings of Hum, limitations required by claim 1 would be missing from the proposed combination. Because of these missing limitations, the proposed combination of Cypher and Hum cannot render claim 1 obvious.

In addition to the missing limitations, the Final Office Action has not shown a valid reason why one skilled in the art would have been led to combine Cypher with Hum in a manner that would result in the claimed invention. More particularly, the particular implementation that the Final Office Action relies on in Cypher is directed towards use of a directory-based coherence protocol in which point-to-point requests for data are made. As such, there is no reason that one skilled in the art would modify Cypher so that a ***broadcasting*** requestor would associate an F-state with its copy of data in response to receipt of the data from memory ***and*** non-data responses from other nodes in the system because such a modification would completely modify Cypher's directory-based, point-to-point protocol. Moreover, in a directory-

based system, there would be no need for the requestor to receive non-data responses from the other nodes.

Accordingly, it is respectfully submitted that a *prima facie* case of obviousness of claim 1 (and its various dependent claims) cannot be established in view of Cypher and Hum for at least the reasons that (1) the proposed combination fails to disclose or suggest all of the recited limitations and (2) no reason exists for modifying Cypher with the teachings of Hum in a manner that would result in the invention recited in claim 1.

Based on the foregoing, it is submitted that the rejection of claims 1 (and its dependent claims 5-6 and 8-9) is in error and should be reversed.

2. Claim 2

Claim 2 depends from claim 1 and is not rendered obvious by the proposed combination of Cypher and Hum for at least the same reasons as discussed with respect to claim 1, as well as because of the additional limitations recited in claim 2. Claim 2 requires that the non-data responses comprise an indication that the other nodes in the system do not have a copy of the data requested by the first node. In rejecting claim 2, the Final Office Action contends that paragraph [0069] of Cypher discloses the limitations of claim 2. *See* Final Office Action, at p. 5. Appellant respectfully disagrees. Paragraph [0069] describes a point-to-point transaction, where a requestor directs a request to a home agent, the home agent returns a copy of the requested data (or directs an owning agent to reply to the requestor with the copy), determines other nodes that have a shared copy, and then invalidates those copies by multicasting invalidate demands only to those other nodes with copies. In view of this protocol, Cypher's requesting node has no need for receiving responses that indicate that the other nodes in the system do not have a copy of the requested data (as required by claim 2) because the home agent detects which nodes have copies and invalidates them.

Accordingly, it is submitted that the rejection of claim 2 is in error and should be reversed.

3. Claim 3

Claim 3 depends from claim 1 and is not rendered obvious by the proposed combination of Cypher and Hum for at least the same reasons as discussed with respect to claim 1, as well as because of the additional limitations recited in claim 3. The Final Office Action contends that Cypher discloses claim 3 by virtue of Figure 4 and paragraph [0068]. *See* Final Office Action, at

p. 5. This contention is respectfully traversed. As previously discussed, paragraph [0068] of Cypher is directed to point-to-point transactions, not broadcast transactions. In addition, paragraph [0068] discloses a point-to-point (not a broadcast) "read to own" request that is transmitted to the home client 102. Claim 3, on the other hand, recites that the source broadcast requesting the data comprises a ***non-ownership*** request for the data. A "read to own" request clearly is not the same as a non-ownership request.

Accordingly, it is respectfully submitted that the rejection of claim 3 is in error and should be reversed.

4. Claim 4

Claim 4 depends from claim 3 and is not rendered obvious by the proposed combination of Cypher and Hum for at least the same reasons as discussed with respect to claim 3, as well as because of the additional limitations recited in claim 4. More particularly, claim 4 requires that the non-ownership request for the data comprises a source broadcast read request. The Final Office Action contends that paragraphs [0007] and [0068] of Cypher disclose the limitations recited in claim 4. *See* Final Office Action, at p. 5. This characterization of Cypher is respectfully traversed.

As discussed previously, paragraph [0007] is a general reference that acknowledges that memory systems can employ a broadcast snooping protocol. This general reference is unrelated to Cypher's specific implementation and, in particular, the implementation disclosed in paragraph [0068]. Paragraph [0068] discloses a directory-based, point-to-point protocol in which a read request is transmitted from the requestor to a home agent. This read request is not a broadcast, as required by claim 4. Moreover, the read to own request disclosed in paragraph [0068] of Cypher is an ownership request, not a non-ownership request as required by claim 4. Accordingly, contrary to the contention set forth in the Final Office Action, Cypher does not disclose the limitations recited in claim 4.

In view of the foregoing, it is respectfully submitted that the rejection of claim 4 is in error and should be reversed.

5. Claim 13

Claim 13 depends from claim 1 and is not rendered obvious by the proposed combination of Cypher and Hum for at least the same reasons as discussed with respect to claim 1, as well as because of the additional limitations recited in claim 13. More particularly, claim 13 requires

that the ordering point defined by the F-state migrates from the first node to another node in response to the another node issuing a source broadcast non-ownership requires for a copy of the data. Contrary to the contention set forth in the Final Office Action, paragraphs [0075]-[0076] do not disclose or suggest this limitation.

As discussed above, the Final Office Action has admitted that Cypher does not disclose an F-state. *See* Final Office Action, at p. 4. Thus, Cypher cannot possibly disclose the migration of an F-state, as recited in claim 13. Paragraphs [0075] and [0076] of Cypher state only that an ordering point may be established. Not only is Cypher's ordering point not defined by an F-state (as required by claim 13), but Cypher does not disclose anything about migration of the ordering point, much less migration in the manner recited in claim 13. The Final Office Action does not contend (correctly so) that Hum compensates for Cypher's deficiencies with respect to the migration of an ordering point.

Accordingly, based on the foregoing, it is respectfully submitted that the rejection of claim 13 is in error and should be reversed.

B. Whether Claims 7 and 10 are unpatentable under 35 U.S.C. § 103(a) over Cypher in view of Hum (U.S. Patent No. 6,922,756) and further in view of Hum 2 (U.S. Patent Publication No. 2004/0123047).

1. Claim 7

Claim 7 depends from claim 1 and is patentable for at least the same reasons as claim 1. The further addition of Hum 2 does not compensate for the deficiencies of Cypher and Hum, which have been discussed above. Thus, even without the addition of Hum 2, the rejection of claim 7 is in error.

With respect to Hum 2, the Final Office Action contends that paragraph [0065] discloses the limitations recited in claim 7. *See* Final Office Action, at p. 7. This characterization of Hum 2 is respectfully traversed, particularly since it appears to have ignored limitations recited in claim 7. That is, claim 7 requires the cache controller to silently evict data by modifying the state information from the F-state to an invalid state for the data. In contrast, paragraph [0065] discloses that nodes can silently evict shared copies of a cache line, but does not disclose that the eviction is performed in the specific manner recited in claim 7. Given the silence of Hum 2 in this regard, the failure of either Cypher or Hum to compensate for this silence, and the lack of a

reason to combine the references in the proposed manner (as discussed above), it is submitted that the proposed combination of Cypher, Hum and Hum 2 cannot render claim 7 obvious.

Accordingly, reversal of the rejection of claim 7 is requested.

2. Claim 10

Claim 10 is based on claim 1 and, thus, is patentable for at least the same reasons, particularly since Hum 2 does not compensate for the deficiencies of Cypher and Hum that have been previously discussed. Moreover, contrary to the Final Office Action's contention, it is respectfully submitted that Hum 2 does not disclose the limitations that are recited in claim 10.

Here, in setting forth the rejection of claim 10, the Final Office Action has incorporated the rationale for the rejection of claim 7. *See* Final Office Action, at p. 7. However, claim 10 recites different limitations than claim 7. Specifically, claim 10 requires that the cache controller comprise a state engine capable of silently evicting data stored in a cache line having an F-state by modifying the state information for the cache line from the F-state to an invalid state for the data. Hum 2 does not disclose these limitations, instead merely teaching silent eviction of a shared copy. *See* Hum 2, para. [0065]. Nothing in Hum 2 discloses or suggests a cache controller that includes a state engine that performs an F-state silent eviction as recited in claim 10. Accordingly, the proposed combination of Cypher, Hum and Hum 2 fails to render claim 10 obvious.

Based on the foregoing, it is respectfully submitted that the rejection of claim 10 is in error and should be reversed.

C. Whether Claims 11, 12, 14, 15, and 17-34 are unpatentable under 35 U.S.C. § 103(a) over Cypher in view of Hum (U.S. Patent No. 6,922,756) and further in view of Arimilli (U.S. Patent No. 6,138,218).

1. Claims 11 and 12

Claim 11 is based on claim 1 and, thus, is patentable for at least the same reasons, particularly since Arimilli does not compensate for the deficiencies of Cypher and Hum that have been previously discussed. Moreover, contrary to the Final Office Action's contention, it is respectfully submitted that Arimilli does not disclose the limitations that are recited in claim 11.

In formulating the rejection of claim 11, the Final Office Action contends that column 6, lines 39-64 of Arimilli discloses the limitations recited in claim 11. *See* Final Office Action, at p. 8. This characterization of the teachings of Arimilli is respectfully traversed. Claim 11

requires transferring to an associated forward progress protocol in response to a request failing in the source broadcast protocol. In contrast, the cited portion of Arimilli discloses moving a coherency state of a requested cache item toward an expected coherency state at the completion of the original operation. Arimilli's state-change action is not the same as transferring to a forward progress protocol based on failure of a request in a different type of protocol (i.e., a source broadcast protocol), as recited in claim 11. In Arimilli, rather than transferring to a different protocol, forward progress is obtained by forcing a state change for the requested cache item. *See* Arimilli, col. 6, lines 45-60.

Based on the foregoing, it is respectfully submitted that the rejection of claim 11 as obvious in view of the proposed combination of Cypher, Hum and Arimilli is in error and should be reversed. Claim 12 depends from claim 11 and thus is patentable for the same reasons as well as for the additional limitations recited in claim 12. Accordingly, the rejection of claim 12 also is in error and should be reversed.

2. Independent Claim 14 and Dependent Claims 15, 17 and 18

Independent claim 14 has been rejected in view of the proposed combination of Cypher, Hum and Arimilli. In formulating this rejection, the Final Office Action incorporates the rationale provided in the rejection of claims 1 and 3. The deficiencies of Cypher and Hum with respect to claims 1 and 3 have been discussed above, including the lack of a reason to combine Cypher and Hum in the proposed manner. These arguments are applicable here also.

The Final Office Action further contends that Arimilli discloses transitioning from the first state to a second state indicating that the data is shared; and the second node transitioning to a third state in response to receiving the shared copy of the data from the first node, such that the second node becomes an ordering point in the network for providing a shared copy of the data. *See* Final Office Action, at p. 9. This characterization of the teachings of Arimilli is respectfully traversed. The cited sections of Arimilli disclose a push operation that results in forcing a state change of data and involves pushing the data to system memory. In contrast, in claim 14, data is transferred between nodes—not pushed to system memory. In addition, the second node transitions to a third state in response to receiving the shared copy of data from the first node, such that the second node then becomes an ordering point in the network for providing a shared copy of the data. Neither Arimilli, Cypher nor Hum, alone or in any combination, teaches or suggests a node that becomes an ordering point when it receives a shared copy of data from

another node. Accordingly, for at least this additional reason, the proposed combination of Cypher, Hum and Arimilli cannot render claim 14 obvious.

In view of the foregoing, it is respectfully submitted that the rejection of independent claim 14, and dependent claims 15, 17 and 18 which are variously based on claim 14, is in error and should be reversed.

3. Claim 19

Claim 19 depends from claim 14 and thus is not rendered obvious by the proposed combination of Cypher, Hum and Arimilli for at least the same reasons discussed above. In addition, claim 19 recites that the third state and the second state are the same. The Final Office Action contends that Arimilli discloses this limitation. *See* Final Office Action, at p. 10. Appellant respectfully disagrees.

With respect to this contention, the cited section of Arimilli describes data from a modified state pushing data to system memory or, if in a different state, changing its state to shared or invalid. *See* Arimilli, col. 3, lines 17-25. Arimilli does not disclose or suggest any states that correspond to the first, second and third states recited in claim 14, much less that the second and third states are the same states, as further required by claim 19. Rather, the particular states disclosed in Arimilli correspond to different states. *See id.*

Based on the foregoing, it is respectfully submitted that the rejection of claim 19 is in error and should be reversed.

4. Independent Claim 20

Independent claim 20 is not rendered obvious by the proposed combination of Cypher, Hum and Arimilli. In formulating this rejection, the Final Office Action incorporates the rationale set forth in its rejection of independent claims 1 and 14. *See* Final Office Action, at p. 10. The deficiencies of the rejection of those claims in view of the cited references have been discussed above, including the lack of a reason to combine the references in the proposed manner. These arguments are likewise applicable with respect to responding to the rejection of claim 20. For instance, as discussed above, the general description of broadcast based protocols and directory based protocols set forth in the background paragraphs [0007] and [0008] of Cypher, taken in conjunction with the specific directory-based point-to-point transaction in Cypher's system (*see* Cypher, at Fig. 8A and para. [0068]), entirely fail to teach the system of claim 20.

More particularly, paragraph [0068] of Cypher is entirely inapplicable to the system recited in claim 20 since paragraph [0068] refers only to a point-to-point transaction and not to a broadcast request for data, as required by claim 20. Additionally, Fig. 8A of Cypher shows that the source agent 100 receives the data from the home node 102 and no other messages. In contrast, claim 20 requires a source processor to transition from a first state to a second state in response to receiving responses from memory ***and*** the at least one target processor. Cypher does not teach or suggest that a source processor could transition between states in the recited manner.

For the reasons discussed previously, Hum does not compensate for the deficiencies of Cypher. More particularly, since Hum's F-state does not occur in response to the state-change conditions recited in claim 20, Hum's F-state cannot correspond to any of the states recited in claim 20.

Arimilli does not compensate for the deficiencies of Cypher and Hum. For example, like Cypher and Hum, Arimilli fails to teach or suggest that a source processor transitions from a first state to a second state in response to receiving responses from memory and the at least one target processor, as recited in claim 20. Instead, Arimilli discloses only that a push operation allows other devices (not the source device) within the system which have the requested cache item in the hovering state to update the data associated with the address tag for the requested cache item. In this manner, the requested cache item transitions to a shared state in the local memory. *See* Arimilli, col. 5, lines 60-67.

Based on the foregoing, it is submitted that the rejection of claim 20 is in error and should be reversed.

5. Claim 21

Claim 21 depends from claim 20 and is not rendered obvious by the proposed combination of Cypher, Hum and Arimilli for at least the same reasons as discussed with respect to claim 20. In addition, claim 21 requires the at least one other processor to respond to the broadcast request with a response indicating that it does not include a valid copy of the data. The Final Office Action contends that paragraph [0069] of Cypher discloses the limitations of claim 21. *See* Final Office Action, at p. 10. This characterization of the teachings of Cypher is respectfully traversed.

As previously discussed, paragraph [0069] of Cypher discloses only a directory-based point-to-point request for data that is directed to the home agent. This point-to-point request is

not a broadcast request, as required by claim 21. Because of the directory-based system, the home agent is able to detect which other agents have copies of the data. Thus, there is no need for any other processors in the network to respond to a broadcast request with a response that indicates that the processor(s) include a valid copy of the data, as further required by claim 21.

Accordingly, based on the foregoing, it is respectfully submitted that the rejection of claim 21 is in error and should be reversed.

6. Claim 23

Claim 23 depends from claim 20 and is not rendered obvious by the proposed combination of Cypher, Hum and Arimilli for at least the same reasons as discussed with respect to claim 20, as well as because of the additional limitations recited in claim 23. The Final Office Action contends that Cypher discloses claim 23 by virtue of Figure 4 and paragraph [0068]. *See* Final Office Action, at p. 10. This contention is respectfully traversed. As previously discussed, paragraph [0068] of Cypher is directed to point-to-point transactions, not broadcast transactions. In addition, paragraph [0068] discloses a point-to-point (not a broadcast) "read to own" request that is transmitted to the home client 102. Claim 23, on the other hand, recites that the source broadcast requesting the data comprises a non-ownership request for the data. A "read to own request" clearly is not the same as the recited non-ownership request.

Accordingly, it is respectfully submitted that the rejection of claim 23 is in error and should be reversed.

7. Claim 24

Claim 24 depends from claim 23 and is not rendered obvious by the proposed combination of Cypher, Hum and Arimilli for at least the same reasons as discussed with respect to claim 23, as well as because of the additional limitations recited in claim 24. More particularly, claim 24 requires that the non-ownership request for the data comprises a source broadcast read request. The Final Office Action contends that paragraphs [0007] and [0068] of Cypher disclose the limitations recited in claim 4. *See* Final Office Action, at p. 10. This characterization of Cypher is respectfully traversed.

As discussed previously, paragraph [0007] is a general reference that acknowledges that memory systems can employ a broadcast snooping protocol. This general reference is unrelated to Cypher's specific implementation and, in particular, the implementation disclosed in paragraph [0068]. Paragraph [0068] discloses a directory-based, point-to-point protocol in

which a read request is transmitted from the requestor to a home agent. This read request is not a broadcast, as required by claim 24. Moreover, the read to own request disclosed in paragraph [0068] of Cypher is an ownership request, not a non-ownership request, as required by claim 24. Accordingly, contrary to the contention set forth in the Final Office Action, Cypher does not disclose the limitations recited in claim 24.

In view of the foregoing, it is respectfully submitted that the rejection of claim 24 is in error and should be reversed.

8. Claim 25

Claim 25 is based on claim 20 and, thus, is patentable for at least the same reasons. Moreover, contrary to the Final Office Action's contention, it is respectfully submitted that Arimilli does not disclose the limitations that are recited in claim 25.

In formulating the rejection of claim 25, the Final Office Action contends that column 6, lines 39-64 of Arimilli discloses the limitations recited in claim 25. *See* Final Office Action, at p. 10. This characterization of the teachings of Arimilli is respectfully traversed. Claim 25 requires transferring to an associated forward progress directory-based protocol if a request in the source broadcast protocol fails. In contrast, the cited portion of Arimilli discloses moving a coherency state of a requested cache item toward an expected coherency state at the completion of the original operation. Arimilli's state-change action is not the same as transferring to a forward progress directory-based protocol based on failure of a request in a different type of protocol (i.e., a source broadcast protocol), as recited in claim 25. In Arimilli, rather than transferring to a different protocol, forward progress is obtained by forcing a state change for the requested cache item. *See* Arimilli, col. 6, lines 45-60.

Based on the foregoing, it is respectfully submitted that the rejection of claim 25 as obvious in view of the proposed combination of Cypher, Hum and Arimilli is in error and should be reversed.

9. Independent Claim 26 and Claim 27

Independent claim 26 is not rendered obvious by the proposed combination of Cypher, Hum and Arimilli. In formulating this rejection, the Final Office Action incorporates the rationale in the rejection of claim 20, which, in turn, incorporates the rationale of the rejections of claims 1 and 14. *See* Final Office Action, at p. 10. The deficiencies of the rejection of those claims in view of the cited references have been discussed above, including the lack of a reason to combine the references in the proposed manner. These arguments are likewise applicable with respect to responding to the rejection of claim 26. For instance, as discussed above, the general description of broadcast based protocols and directory based protocols set forth in the background paragraphs [0007] and [0008] of Cypher, taken in conjunction with the specific directory-based point-to-point transaction in Cypher's system (*see* Cypher, at Fig. 8A and para. [0068]), entirely fail to teach the system of claim 20.

Yet further, paragraph [0068] of Cypher is entirely inapplicable to the system recited in claim 26 since paragraph [0068] refers only to a point-to-point read-to-own request for data and not to a broadcast non-ownership request for data, as required by claim 26. In addition, in the system described with respect to Fig. 8A of Cypher, the source agent 100 receives the data from the home node 102 and no other messages. Claim 26, on the other hand, requires means for enabling a first node to respond to subsequent non-ownerships requests for data from other nodes by providing a shared copy of data received from memory. Cypher's source agent is not configured in this manner.

For the reasons discussed previously, Hum does not compensate for the deficiencies of Cypher in this regard. More particularly, since Hum's approach does not transition into its F-state in the same manner as the means for enabling that is recited in claim 26, Hum's F-state cannot correspond to any of the limitations recited in claim 26.

Arimilli does not compensate for the deficiencies of Cypher and Hum. For example, like Cypher and Hum, Arimilli fails to teach or suggest means for enabling a first node to respond to subsequent non-ownership requests for data from other nodes by providing a shared copy of data received from memory, as recited in claim 26. Rather, Arimilli teaches that the push operation allows other devices (not the means for broadcasting) within the system which have the requested cache item in the hovering state to update the data associated with the address tag for

the requested cache item, such that the requested cache item transitions to a shared state in the local memory. *See* Arimilli, col. 5, lines 60-67.

In view of the foregoing, it is respectfully submitted that the rejection of claim 26 (and its dependent claim 27) is in error and should be reversed.

10. Claim 28

Claim 28 is based on claim 26 and, thus, is patentable for at least the same reasons. Moreover, contrary to the Final Office Action's contention, it is respectfully submitted that Arimilli does not disclose the limitations that are recited in claim 28.

In formulating the rejection of claim 28, the Final Office Action contends that column 6, lines 39-64 of Arimilli discloses the limitations recited in claim 28. *See* Final Office Action, at p. 11. This characterization of the teachings of Arimilli is respectfully traversed. Claim 28 requires means for transferring to an associated forward progress directory-based protocol if a request in the source broadcast protocol fails. In contrast, the cited portion of Arimilli discloses moving a coherency state of a requested cache item toward an expected coherency state at the completion of the original operation. Arimilli's state-change action is not the same as transferring to a forward progress directory-based protocol based on failure of a request in a different type of protocol (i.e., a source broadcast protocol), as recited in claim 25. In Arimilli, rather than transferring to a different protocol, forward progress is obtained by forcing a state change for the requested cache item. *See* Arimilli, col. 6, lines 45-60.

Based on the foregoing, it is respectfully submitted that the rejection of claim 28 as obvious in view of the proposed combination of Cypher, Hum and Arimilli is in error and should be reversed.

11. Claim 29

Claim 29 depends from claim 26 and is not rendered obvious for at least the same reasons as claim 26 and for the following reasons. The Final Office Action contends that Fig. 4 and paragraph [0068] of Cypher discloses the limitations recited in claim 29. *See* Final Office Action, at p. 11. This characterization of Cypher is respectfully traversed. More particularly, Cypher fails to teach or suggest a home node for the requested data and means for blocking the home node from responding with the data to another request, as recited in claim 29. Rather, the cited portion of Cypher discloses a request agent that transmits a point-to-point read to own request to the home client 102 that may supply the requested data. However, there is nothing in

Cypher that teaches or suggests a means for blocking the home client from responding with data to another request, as recited in claim 29. Moreover, as previously discussed, this portion of Cypher describes a directory-based point-to-point protocol. As such, there would be no reason to employ the recited means for blocking because Cypher does not have the recited means for broadcasting a request.

In view of the foregoing, it is respectfully submitted that the rejection of claim 29 is in error and should be reversed.

12. Independent Claim 30 and Claim 33

Independent claim 30 is not rendered obvious by the proposed combination of Cypher, Hum and Arimilli. In formulating this rejection, the Final Office Action incorporates the rationale set forth in its rejection of independent claim 26 which, in turn, incorporates the rationale of the rejection of independent claim 20 which, in turn, incorporates the rationale of the rejection of independent claims 1 and 14. *See* Final Office Action, at p. 11. The deficiencies of the rejection of each of those claims in view of the cited references have been discussed above, including the lack of a reason to combine the references in the proposed manner. These arguments are likewise applicable with respect to responding to the rejection of claim 30. For instance, as discussed above, the general description of broadcast based protocols and directory based protocols set forth in the background paragraphs [0007] and [0008] of Cypher, taken in conjunction with the specific directory-based point-to-point transaction in Cypher's system (*see* Cypher, at Fig. 8A and para. [0068]), entirely fail to teach the method of claim 30.

More particularly, paragraph [0068] of Cypher is entirely inapplicable to the method recited in claim 30 since paragraph [0068] refers only to a point-to-point transaction and not to broadcasting a request for data, as required by claim 30. Additionally, Fig. 8A of Cypher shows that the source agent 100 receives the data from the home node 102 and no other messages. In contrast, claim 30 requires transitioning the source node into an F-state in response to receiving the data from memory ***and*** non-data responses from other target nodes indicating that the data is shared with at least one other target node. Cypher does not teach or suggest that a source node could transition to the F-state in response to the conditions recited in claim 30.

For the reasons discussed previously, Hum does not compensate for the deficiencies of Cypher. More particularly, since Hum's transition to its F-state does not occur in response to the

conditions recited in claim 30 (i.e., receiving data from memory and receiving the recited non-data responses), Hum's F-state cannot correspond to the F-state recited in claim 30.

Arimilli does not compensate for the deficiencies of Cypher and Hum. For example, like Cypher and Hum, Arimilli fails to teach or suggest transitioning a source node to an F-state in response to receiving the data from memory and non-data responses from other target nodes indicating that the data is shared with at least one of the other target nodes. Instead, Arimilli discloses only that a push operation allows other devices (not the source device) within the system which have the requested cache item in the hovering state to update the data associated with the address tag for the requested cache item. In this manner, the requested cache item transitions to a shared state in the local memory. *See* Arimilli, col. 5, lines 60-67.

Based on the foregoing, it is submitted that the rejection of claim 30 (and its dependent claim 33) is in error and should be reversed.

13. Claim 31

Claim 31 depends from claim 30 and is not rendered obvious for at least the same reasons, as well as for the additional limitations recited in claim 31. In formulating the rejection of claim 31, the Final Office Action contends that column 5, lines 57-67 of Hum discloses silently evicting the data from the source node by modifying the state of the data in the source node to an invalid state. *See* Final Office Action, at p. 11. This characterization of the teachings of Hum is respectfully traversed.

There is nothing in the cited section of Hum that refers to silent eviction, much less silently evicting data in a source node by modifying its state to an invalid state. Rather, the only states discussed in this section are the Forward State, the Owned State and the Shared State---none of which are Invalid States and none of which are used to silently evict data.

Accordingly, it is respectfully submitted that the rejection of claim 31 is in error and should be reversed.

14. Claim 32

Claim 32 depends from claim 30 and is not rendered obvious for at least the same reasons, as well as for the additional limitations recited in claim 32. In formulating the rejection of claim 32, the Final Office Action contends that Cypher discloses moving the ordering point for the data from the source node to another node in response to a non-ownership request for the data. *See* Final Office Action, at p. 11. This characterization of Cypher is respectfully traversed.

More particularly, Cypher discloses only that a node or a client can be an ordering point. *See* Cypher, paras. [0075]-[0076]. Cypher does not disclose that this ordering point can move to another node or client, much less that it can move in response to a non-ownership request for the data, as recited in claim 32.

Accordingly, it is respectfully submitted that the rejection of claim 32 is in error and should be reversed.

15. Claim 34

Claim 34 is based on claim 30 and, thus, is patentable for at least the same reasons, as well as for the additional limitations recited in claim 34. In formulating the rejection of claim 34, the Final Office Action has relied on the rationale used in the rejection of claim 11, which cited Arimilli as disclosing the claimed limitations. *See* Final Office Action, at p. 4 & 12. Contrary to the Final Office Action's contention, it is respectfully submitted that Arimilli does not disclose the limitations that are recited in claim 34.

Claim 34 requires reissuing a read request employing an associated forward progress if the read request broadcast by the source node fails while employing the source broadcast protocol. In contrast, the cited portion of Arimilli discloses moving a coherency state of a requested cache item toward an expected coherency state at the completion of the original operation. Arimilli's state-change action is not the same as transferring to a forward progress based on failure of a request in a different type of protocol (i.e., a source broadcast protocol), as recited in claim 34. In Arimilli, rather than reissuing a read request employing a forward progress, forward progress is obtained by forcing a state change for the requested cache item. *See* Arimilli, col. 6, lines 45-60.

Based on the foregoing, it is respectfully submitted that the rejection of claim 341 as obvious in view of the proposed combination of Cypher, Hum and Arimilli is in error and should be reversed.

D. Whether Claims 16 and 22 are unpatentable under 35 U.S.C. § 103(a) over Cypher in view of Hum (U.S. Patent No. 6,922,756), Arimilli, and further in view of Hum 2 (U.S. Patent Publication No. 2004/0123047).

Claims 16 and 22 are based on claims 14 and 20, respectively, and thus are patentable for at least the reasons discussed above with respect to claims 14 and 20. In addition, claims 16 and 22 are patentable because of the additional limitations recited in each of claims 16 and 22. In

formulating the rejections of claims 16 and 22, the Final Office Action contends that paragraph [0065] of Hum 2 discloses the recited limitations. This characterization of the teachings of Hum 2 is respectfully traversed.

More particularly, claim 16 recites that a cache line in one of the first and second states is capable of silently evicting associated data by modifying the state information for the cache line to an invalid state. Claim 22 recites that a source processor, after transitioning to the second state, is capable of silently evicting the desired data by returning to the first state. In contrast, Hum 2 simply acknowledges that a shared copy of a cache line can be silently evicted. Hum 2 does not disclose how the silent eviction is accomplished or that the silent eviction is in any way associated with the state of the cache line (as recited in claim 16) or the state of the source processor (as recited in claim 22). Accordingly, it is submitted that the Final Office Action has not established that Hum 2 teaches or suggests all of the limitations recited in claims 16 and 22.

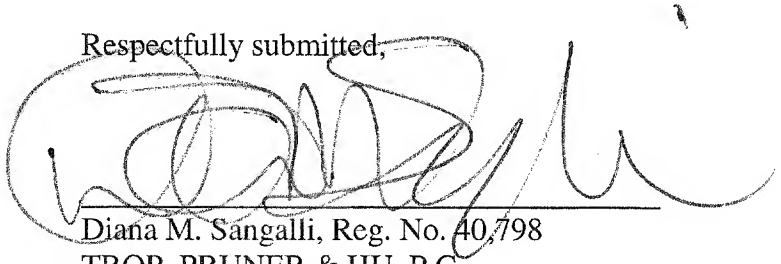
Moreover, it is respectfully submitted that the Final Office Action has failed to set forth a valid reason that would have led one skilled in the art to modify the teachings of Cypher, Hum and Arimilli with the teachings of Hum 2 in a manner that would have led to the invention recited in claims 16 and 22. Here, the Final Office Action contends that one skilled in the art would have included silent eviction "because this would have enabled the agent to not be aware that all copies have been evicted." *See* Final Office Action, at pp. 12 & 13 (citing to Hum 2, para. [0065], lines 7-10). It is respectfully submitted that rather than presenting a reason that would motivate the use of silent eviction, the Final Office Action has cited a problem that exists with silent eviction---i.e., because of silent eviction, some agents will not be aware that copies have been evicted. Towards that end, the Final Office Action has provided no explanation of why one skilled in the art would believe it desirable to "enable[] an agent to not be aware that all copies have been evicted."

For this reason, as well as for the reason that the combined references do not teach or suggest all of the claimed limitations, it is respectfully submitted that the rejection of claims 16 and 22 is in error and should be reversed.

CONCLUSION

For at least the reasons set forth above, Appellant respectfully requests that each of the final rejections be reversed and that the claims subject to this Appeal be allowed to issue.

Respectfully submitted,



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CLAIMS APPENDIX

The claims on appeal are:

1. A system comprising:

a first node operative to provide a source broadcast requesting data, the first node associating an F-state with a copy of the data in response to receiving the copy of the data from memory and receiving non-data responses from other nodes in the system, the non-data responses including an indication that at least a second node includes a shared copy of the data, the F-state enabling the first node to serve as an ordering point in the system capable of responding to requests from the other nodes in the system with a shared copy of the data.

2. The system of claim 1, wherein the non-data responses further comprise an indication that the other nodes in the system do not have a copy of the data requested by the first node.

3. The system of claim 1, wherein the source broadcast requesting the data comprises a non-ownership request for the data.

4. The system of claim 3, wherein the non-ownership request comprises a source broadcast read request.

5. The system of claim 1, wherein the first node comprises a first processor having an associated cache that comprises plurality of cache lines, one of the cache lines having an address associated with the copy of data received from memory and state data that defines the state of the data stored in the one of the cache lines.

6. The system of claim 5, wherein the first processor further comprises a cache controller that controls the state of the data stored in the plurality of cache lines.

7. The system of claim 6, wherein the cache controller is capable of silently evicting the data stored in the one of the cache lines by modifying the state information from the F-state to an invalid state for the data.

8. The system of claim 1, wherein each node defines a processor having an associated cache that comprises a plurality of cache lines, each cache line having a respective address that identifies associated data and state information that indicates a state of the associated data for the respective cache line, each of the processors being capable of communicating with each other via an interconnect.

9. The system of claim 8, further comprising a cache controller associated with each cache for managing data requests and responses for the respective cache.

10. The system of claim 9, wherein the cache controller further comprises a state engine capable of silently evicting data stored in a cache line having the F-state by modifying the state information for the cache line from the F-state to an invalid state for the data.

11. The system of claim 1, wherein the system implements a source broadcast protocol to process requests and responses provided by nodes within the system, the system transferring to an associated forward progress protocol in response to a request failing in the source broadcast protocol.

12. The system of claim 11, wherein the forward progress protocol comprises a directory-based protocol.

13. The system of claim 1, wherein the ordering point defined by the F-state migrates from the first node to another node in response to the another node issuing a source broadcast non-ownership request for a copy of the data.

14. A multiprocessor network comprising:

a plurality of processor nodes in communication with each other;

at least a first node of the plurality of processor nodes includes a copy of data associated with a given address that is also shared with memory, the first node operating in a first state that causes the first node to respond to a non-ownership request from a second node of the plurality of processor nodes for the data by (i) sending a response to the second node that includes a shared copy of the data, and (ii) transitioning from the first state to a second state indicating that the data is shared; and

the second node transitioning to a third state in response to receiving the shared copy of the data from the first node, such that the second node becomes an ordering point in the network for providing a shared copy of the data.

15. The network of claim 14, wherein each of the plurality of processor nodes further comprises an associated cache that comprises a plurality of cache lines, each cache line having a respective address that identifies associated data and state information that indicates the state of the associated data for the respective cache line.

16. The network of claim 15, wherein a cache line in one of the first and second states being capable of silently evicting associated data by modifying the state information for the cache line to an invalid state.

17. The network of claim 14, wherein the network implements a source broadcast protocol to process requests provided by nodes within the network and, if a request fails, the requests are reissued by the nodes using an associated forward progress protocol.

18. The network of claim 17, wherein the forward progress protocol comprises a directory-based protocol.

19. The network of claim 14, wherein the third state and the second state are the same.

20. A computer system, comprising:

a plurality of processors comprising:

a source processor that issues a broadcast request for desired data while in a first state; and

at least one target processor having an associated cache that includes a shared copy of the desired data, the at least one target processor responding to the broadcast request with a response indicating that the at least one target processor includes the shared copy of the desired data;

memory storing the desired data, the memory responding to the broadcast request with a response that includes a copy of the desired data; and

the source processor transitioning from the first state to a second state in response to receiving the responses from the memory and the at least one target processor, the second state enabling the first processor to respond to requests from other of the plurality of processors with a copy of the desired data.

21. The system of claim 20, further comprising at least one other processor having an associated cache that does not include a valid copy of the desired data, the at least one other processor responding to the broadcast request with a response indicating that the at least one other processor does not include a valid copy of the desired data.

22. The system of claim 20, wherein the source processor, after transitioning to the second state, is capable of silently evicting the desired data by returning to the first state.

23. The system of claim 20, wherein the broadcast request for the desired data comprises a non-ownership request.

24. The system of claim 23, wherein the non-ownership request comprises a source broadcast read request.

25. The system of claim 20, wherein the system implements a source broadcast protocol that defines rules for processing broadcast requests provided by processors within the system and, if a request fails, the system transfers to an associated forward progress directory-based protocol.

26. A system, comprising:

means for broadcasting from a first node a non-ownership request for data;

means for indicating that at least one other node in the system has a shared copy of the requested data;

means for providing from memory a copy of the requested data to the means for broadcasting; and

means for enabling the first node to respond to subsequent non-ownership requests for the data from other nodes in the system by providing a shared copy of the data received from memory.

27. The system of claim 26, wherein the means for enabling defines an ordering point in the system for responding to non-ownership requests for the data, the system further comprising means for migrating the ordering point from the first node to another node in the system in response to a non-ownership request for the data provided by the another node.

28. The system of claim 26, wherein the system employs a source broadcast protocol that defines rules for processing broadcast requests provided by processors within the system, the system further comprising means for transferring to an associated forward progress directory-based protocol for processing a request if the request fails in the source broadcast protocol.

29. The system of claim 26, wherein the memory comprises a home node for the requested data, the system further comprising means for blocking the home node from responding with data to another request if the first node provides a response to the another request that includes a shared copy of the data.

30. A method comprising:

broadcasting a read request for data from a source node to other nodes of an associated system;

transitioning the source node into an F-state in response to receiving the data from memory and receiving non-data responses from other target nodes in the system indicating that the data is shared with at least one of the other target nodes; and

enabling the source node, while in the F-state, to serve as an ordering point that is capable of responding to non-ownership requests for the data by providing a shared copy of the data.

31. The method of claim 32, further comprising silently evicting the data from the source node by modifying the state of the data in the source node to an invalid state.

32. The method of claim 30, further comprising moving the ordering point for the data from the source node to another node in response to a non-ownership request for the data provided by the another node.

33. The method of claim 30, wherein the associated system defines a multiprocessor system that includes a plurality of processor nodes, including the source node and the other target nodes, each of the processor nodes comprising a cache that stores data in corresponding cache lines, each cache line having an associated address and state information that defines a state for the data in the corresponding cache line.

34. The method of claim 30, further comprising:

employing a broadcast protocol that defines rules for processing the broadcast read request provided by the source node; and

reissuing the read request employing an associated forward progress if the read request broadcast by the source node fails while employing the source broadcast protocol.

35. The method of claim 34, wherein the memory comprises a home node for the data requested by the source node, the method further comprising:

sending an instruction from the source node having the F-state to block the home node from responding with data to a subsequent non-ownership request for the data if the source node provides a response to the subsequent non-ownership request that includes a shared copy of the data.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.